Cost / Schedule
Executive Session

Director's CD-1/Trial CD-2
Review of the
MINERvA Project

December 13-15, 2005

L. Edward Temple, Jr.

Agenda

Wednesday, December 14, 2005 (Morning break will be available outside Comitium at 10:30)

8:00 – 8:30 AM	30	Cost & Schedule Executive Session (Comitium – WH2SE)	Ed Temple
		Breakout Sessions	
8:30 – 12:30 PM		• WBS 1, 2 & 4 Scintillator & Fiber (Snake Pit – WH2NE)	Anna Pla-Dalmau, Howard Budd
8:30 – 12:30 PM		• WBS 3, 8 & 9 Module/Plane, Detector Parts Assembly (Black Hole – WH2NW)	Jeff Nelson, Jim Kilmer, Robert Bradford, Ron Ransome
8:30 – 12:30 PM		• WBS 5, 6 & 7 PMT's, PMT Boxes and Electronics & DAQ (Racetrack – WH7X)	Ioana Niculescu, Tony Mann, Casper, Paolone
9:30 – 12:30 PM		• WBS 10 Management/Cost/Schedule/ WBS 11 I&I (Comitium WH2SE)	Debbie Harris, Nancy Grossman, TJ Sarlina, Sheri Landrud
12:30 – 1:30 PM		LUNCH (WH2X)	
1:30 – 2:30 PM		MINERvA's response to review committees questions (Comitium – WH2SE)	Debbie Harris, Nancy Grossman
2:30 – 4:00 PM		Executive Session	Ed Temple
4:00 PM		Report Writing	

Thursday, December 15, 2005

8:00 – 10:00 AM	Continue Report Writing	
10:00 – 2:30 PM	Closeout Dry Run with working lunch (Comitium – WH2SE)	
2:30 PM	Closeout (Racetrack – WH7X)	

Cost/Schedule Review Guidance

These are CD-2 Requirements.

Now at CD-1.

We should use as a guide for assessing a baseline "range" or appropriate contingency.

Project Technical, Cost, and Schedule Baseline Development

To Succeed in Cost / Schedule Arena

Estimate must be
- **Complete**
  - Scope well understood and defined
    - Technical goal must be clear
    - Technology to be used to meet this goal known
    - Designate how technical systems will be acquired
      - I.e. buy, have fabricated, self fabricated
      - Buy parts / fabricate / assemble
    - How will this be accomplished
      - Self fabricate / assemble – lab or university(ies)
      - How will person power requirements be met
        - And paid for
  - All tasks defined and specified in a work breakdown structure
  - WBS dictionary
- **Documented** at lowest level of WBS and include
  - M&S – materials and services
  - SWF – salaries, wages, & fringes
  - Accompanied by schedule showing appropriate durations
  - Adders – overheads / G&A (general & administrative)
  - Escalated – shown both with and without escalation with funding profile based on laboratory/DOE/Federal budget/appropriation guidance

Cost/Schedule Review Guidance

(Continued)

Reviewable

Estimate must “roll-up” from the lowest level to the total and reviewers must be able to drill down from the top to the lowest level

Credible

Basis of estimate must be specified

- Catalog prices
- Similar work, where cost is documented
- Engineering estimates
- WAG – wild ass guess

This material forms basis for DOE approving a baseline, for Fermilab/Collaboration Project Management to measure performance and take appropriate corrective actions during execution and for Laboratory Management and DOE to monitor progress.

Cost/Schedule Review Guidance

(Continued)

Baseline Reviews

When preparing a baseline, it can be helpful to be aware of and prepared for the types of things a Director's Technical/Cost/Schedule/Management Review Committee or a DOE Baseline Review Committee will be looking for. The following provides some insight into such reviews. Review Committees are frequently broken up into subgroups which are then assigned to look at specific systems or subprojects within a project.

To be available for reviewers one week prior to the review

- Conceptual &/or Technical Design Reports
- Design Review materials (web address was provided)
  - Materials presented at most recent design review for system
- Detailed schedule for system (to be looked at during breakout sessions)
- Cost Estimate Details for system (will be provided at low levels of the WBS)
  - Including WBS Dictionary and BOE – Basis of Estimate detail sheets
  - (BOE notebooks will be available in breakout rooms)

Tabbed hardcopies of review materials and presentations to be available at the review. Enough for committee, observers, and a half dozen extras

Cost/Schedule Review Guidance

(Continued)

Technical / Cost / Schedule / Management Review Guidelines
(things reviewers are asked to do)

Technical

Examine Design Review Materials (including TDRs & CDRs) for your system
- Assess level at which **scope is understood and defined**
- Assess level that **technical aspects of the system are understood, planned, designed, procured/fabricated and/or prototyped**

Cost

Choose >~5 top level WBS elements from your system
- *Drill down* to successively lower levels of the WBS; while at each step
  - Understanding the **scope** of that element
  - Understanding the **schedule** for that element
  - Understanding the **basis of estimate** (BOE) for **both M&S and effort** for that element
  - Choose a few elements next lowest level of the WBS
    - And repeat this procedure until you get to the bottom level.
    - I.e., the lowest level of the WBS

Choose >~5 items in the system for which you have personal experience
- Interact with the responsible managers to **determine if**
  - **The Estimate is complete, documented, reviewable, and credible**

Cost/Schedule Review Guidance

(Continued)

Check that there is **a detailed BOE for all work elements** in your system

Check whether the **estimate for your system "rolls-up"** from the lowest level WBS element to the total for your system

Does each level of the WBS contain all costs from lower level WBS elements

Assess the **"bottoms up" contingency that the WBS level 3 managers would assign** their components.

Assess the **"top down" contingency analysis assignments by the Project Manager**

Schedule

Is there a detailed schedule, including a critical path, for completing the project? Are milestones appropriate in number and type identified so that the project teams, Fermilab management, and DOE can effectively track and manage progress? Based on past experience, can the proposed schedules be met? Are appropriate schedule contingencies provided? Is there a "resource loaded schedule" and plan for providing the needed resources (M&S and technical support staff and physicists)?

Cost/Schedule Review Guidance

(Continued)

Funding

Have techniques such as forward funding by collaborators and phased funding of large contracts been appropriately incorporated into the planning? Does the anticipated funding profile support the resource requirements?

Management

Is an **appropriate / adequate project organizational structure** in place and **staffed** (or are plans in place) to do the job.

Has the **appropriate project management documentation** been prepared. Is it of a quality adequate for this stage of the project? Are **appropriate / adequate management systems** (Cost and Schedule Control System / Earned Value Reporting, Critical Path Management, Risk Management, etc.) in place or planned for use during project execution?

Reviewer Assignments

Executive Summary	Ed Temple
1.0 Introduction	Dean Hoffer
2.0 Science	Heidi Schellman
3.0 Scintillator Extrusions, WLS Fiber and Clear Fiber Cables	Dmitri Denisov, Heidi Schellman
4.0 Plane Assembly, Outer Detector Frame, Absorbers, Stand and Module Assembly	Mike Crisler, Joe Howell
5.0 PMT's and PMT Boxes	Karol Lang, Hogan Nguyen
6.0 Electronics & DAQ	Hogan Nguyen, Karol Lang
7.0 Installation and Infrastructure	Mike Lindgren, Marc Kaducak, Dean Hoffer
8.0 Cost and Schedule	Marc Kaducak, Jeff Simms, Dean Hoffer
9.0 Management	Jeff Sims, Mike Lindgren, Ed Temple

Reviewer Assignments
(continued)

10.0 Charge Questions	
10.1 Are the physics requirements clearly stated and documented?	Heidi Schellman, Dmitri Denisov, Hogan Nguyen, Joe Howell, Karol Lang, Mike Crisler, Mike Lindgren
10.2 Have these physics requirements been translated into technical performance requirements / specifications?	
10.3 Have alternative designs been considered and reasons for selecting one alternative over anther documented and deemed reasonable?	
10.4 Can the design be built? Does the design meet the technical specifications? Is it a reasonable design?	
10.5 Is the Work Breakdown Structure (WBS) appropriate for the project scope?	Dean Hoffer, All
10.6 Do the cost estimates for each WBS (or cost) element have a sound documented basis and are they reasonable?	
10.7 Does an obligation profile exist?	

* Note underlined names are the primary writer.

Reviewer Assignments
(continued)

	10.8 Is the schedule well developed and resource loaded?	Marc Kaducak, All
	10.9 Are the activity durations reasonable for the assumed resources?	
	10.10 Is the schedule duration feasible for the resources assigned to accomplish the tasks?	
	10.11 Does the schedule contain appropriate levels of milestones, sufficient quantity of milestones for tracking progress and do they appear to be achievable?	
	10.12 Does the schedule include activities for design reviews, which include assessment of the designs readiness for procuring prototypes, preproduction and production materials?	

* Note underlined names are the primary writer.

Reviewer Assignments
(continued)

	10.13 Is there an appropriate management organizational structure in place to accomplish the design and construction?	Jeff Sims, All
	10.14 Is the organization structure well documented, responsibilities defined and appropriate for the scope of work?	
	10.15 Are there adequate staffing resources available or planned for this effort?	
	10.16 Is there a funding plan available or proposed to meet the resource requirements to realize the project?	
	10.17 Has a Risk Assessment been performed, mitigations identified, actions taken and do they seem appropriate?	

* Note underlined names are the primary writer.

Breakout Assignments

WBS 1, 2 & 4 Scintillator & Fiber (Snake Pit – WH2NE)	Dmitri Denisov, Heidi Schellman
WBS 3, 8 & 9 Module/Plane, Detector Parts Assembly (Black Hole – WH2NW)	Joe Howell, Mike Crisler
WBS 5, 6 & 7 PMT's, PMT Boxes and Electronics & DAQ (Racetrack – WH7X)	Karol Lang, Hogan Nguyen
WBS 10 Management/Cost/Schedule/ WBS 11 I&I (Comitium WH2SE)	Marc Kaducak, Jeff Sims, Mike Lindgren, Dean Hoffer, Ed Temple

MINERvA's Cost & Contingency Estimate

	WBS	Items	MINERvA's Estimate AY$									
			Base w/Indirects			Contingency %			Contingency $			Total Base w/Indirects and Cont.
			M&S	Labor	Total	M&S	Labor	Total	M&S	Labor	Total	
MIE	1.0	Scintillator Extrusion	$ 41,237	$ 206,691	$ 247,928	27%	21%	22%	$ 11,009	$ 44,095	$ 55,103	$303,031
	2.0	WLS Fibers	$ 406,771	$ 163,583	$ 570,354	41%	21%	35%	$ 167,622	$ 34,016	$ 201,638	$ 771,992
	3.0	Scintillator Plan Assembly	$ 232,706	$ 712,406	$ 945,112	48%	40%	42%	$ 110,616	$ 284,963	$ 395,578	$ 1,340,690
	4.0	Clear Fiber Cables	$ 334,136	$ 605,394	$ 939,530	39%	38%	38%	$ 129,351	$ 230,247	$ 359,597	$ 1,299,127
	5.0	Photomultiplier Tube Boxes	$ 465,103	$ 305,971	$ 771,074	40%	34%	38%	$ 184,666	$ 104,805	$ 289,471	$ 1,060,545
	6.0	Photomultiplier Tubes	$ 1,068,174	$ 127,635	$ 1,195,809	30%	33%	30%	$ 319,108	$ 42,120	$ 361,228	$ 1,557,037
	7.0	Electronics and DAQ	$ 474,204	$ 22,830	$ 497,034	35%	34%	35%	$ 165,489	$ 7,685	$ 173,174	$ 670,207
	8.0	Frames, Absorbers, Coil and Detector Stand	$ 524,120	$ 134,728	$ 658,849	26%	50%	31%	$ 137,154	$ 67,364	$ 204,518	$ 863,367
	9.0	Module and Veto Wall Assembly & Installatior	$ 55,556	$ 220,341	$ 275,897	44%	89%	80%	$ 24,251	$ 195,316	$ 219,567	$ 495,464
	10.0	Project Management	$ -	$ 584,097	$ 584,097		30%	30%	$ -	$ 175,229	$ 175,229	$ 759,326
		Total MIE:	**$ 3,602,007**	**$ 3,083,676**	**$ 6,685,683**	**35%**	**38%**	**36%**	**$ 1,249,265**	**$ 1,185,839**	**$ 2,435,103**	**$ 9,120,786**
OPC		**R&D**	$ 1,018,693	$ 1,776,276	$ 2,794,969	36%	37%	37%	$ 362,029	$ 658,166	$ 1,020,195	$ 3,815,165
		Total OPC:	**$ 1,018,693**	**$ 1,776,276**	**$ 2,794,969**	**36%**	**37%**	**37%**	**$ 362,029**	**$ 658,166**	**$ 1,020,195**	**$ 3,815,165**
		TPC:	**$ 4,620,700**	**$ 4,859,952**	**$ 9,480,652**	**35%**	**38%**	**36%**	**$ 1,611,294**	**$ 1,844,005**	**$ 3,455,299**	**$ 12,935,951**
	11.0	Installation and Infrastructure	$ 174,194	$ 424,019	$ 598,213	34%	41%	39%	$ 58,604	$ 174,737	$ 233,341	$ 831,553

Committee's Cost & Contingency Estimate

	WBS	Items	Review Comittee Estimate AY$									
			Base w/Indirects			Contingency %			Contingency $			Total Base
			M&S	Labor	Total	M&S	Labor	Total	M&S	Labor	Total	w/Indirects and
MIE	1.0	Scintillator Extrusion										
	2.0	WLS Fibers										
	3.0	Scintillator Plan Assembly										
	4.0	Clear Fiber Cables										
	5.0	Photomultiplier Tube Boxes										
	6.0	Photomultiplier Tubes										
	7.0	Electronics and DAQ										
	8.0	Frames, Absorbers, Coil and Detector Stand										
	9.0	Module and Veto Wall Assembly & Installation										
	10.0	Project Management										
		Total MIE:										
OPC		**R&D**										
		Total OPC:										
		TPC:										
	11.0	Installation and Infrastructure										